

Neuropolitics: The State of the Literature & Its Implications for Political Science

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Table of Contents

1. Introduction	3
1.1 Context.....	4
1.2 Research Question	4
1.3 Overarching Method.....	4
2. Orienting Literature Review	5
2.1 Context.....	5
2.2 Research Question	5
2.3 Method	5
2.4 Methodological Findings – Orienting Literature Review	6
2.4.1 Lesion Studies	6
2.4.2 fMRI.....	6
2.5 Substantive Findings – Orienting Literature Review	6
2.5.1 Political Messaging	6
2.5.2 Political Decision-Making.....	7
2.5.3 Political Behaviour	8
2.6 Gaps That Emerged	8
3. Contemporary Literature Review	8
3.1 Context and choice of dataset	8
3.2 Review Method	9
3.3 Methodological Findings – Contemporary Literature Review	10
3.3.1 Implicit Association Testing	10
3.3.2 fMRI.....	11
3.3.3 The Study of Emotion.....	11
3.3.4 Experimental Design	11
3.4 Substantive Findings – Contemporary Literature Review	12
3.4.1 Emotion	12
3.4.1.1 The Use of Emotion as an Instrument.....	13
3.4.1.2 Negative Emotion	13
3.4.1.2.1 Anger.....	13
3.4.1.2.2 Anxiety	14
3.4.1.3 Positive Emotion.....	15
3.4.1.3.1 Empathy	15
3.4.1.3.2 Compassion.....	15
3.4.1.4 Collective Emotion	15
3.4.2 Genetics.....	16
3.4.3 Cognitive Processing.....	19
3.4.3.1 Motivated Reasoning	19
3.4.3.2 Memory	21
4. Conclusion	24
Appendix A: Summary of Systematic Literature Review Findings.....	27
Appendix B: Glossary of Theories.....	30
Works Cited	32

“Yet we are clearly at the very beginning of our understanding of the complex relation among the brain, behaviour, and emotion. Humility is an appropriate emotion in the face of this realization.”

- Rose McDermott (p. 397, *The Affect Effect*)

1. Introduction

Questions of the mind and brain have long plagued political theory. From early questions posed by the ancient Greeks like Aristotle and Plato, later work done by those in the 19th Century like Merleau-Ponty, to work done by present-day thinkers and theorists. These questions often relate to our behaviour and thinking, how we interact with one another, how we make decisions and how our perception of the world around us is shaped. All of this informs who we are as political animals. Our politics and our humanity are closely intertwined. As such, it is only natural that studies of who we are and what makes us tick overlap with studies of our politics.

My interest in the subject of neuropolitics originated with the reading of *Thinking Fast and Slow* by Daniel Kahneman and *The Political Brain* by Drew Westen. The introduction to these texts during a fourth-year applied political ethics course opened my eyes to an area of political studies I previously had no idea existed. Applying the methods and findings of neuroscience to address questions that had long puzzled political thinkers was and continues to be fascinating to me. While I understand that this form of interdisciplinary research and a blanket application of neuroscience tools to politics cannot provide all the answers to questions of political theory, I believe the information gained through the incorporation of the findings and methodology can provide great insight.

Early thinkers were limited in their work by being bound to their experience and thought; use of methods like phrenology, the idea that through the study of bumps on the skull, we can learn about the brain and mind; early crude methods of surgery; and work done on those who experienced damages or lesions to the brain. One of the most well-known examples of this lesion-based work is the case of Phineas Gage, a man who experienced a rail-tamping rod going through his skull and brain, causing him to lose a portion of his grey matter. Luckily for Phineas and science, he lived, and from studying his behaviour following his accident, doctors learned a great deal about the brain and how it connects to our behaviour. Work like that which was done on Phineas Gage led to further studies demonstrating that the brain is not an impassionate, rational entity as was previously thought. What has come to be widely understood is that the brain is highly passionate and emotional, and this affects everything we do from our personal interactions to our political decisions.

Compared to the distant past, today, researchers have access to a wide variety of tools and methods with which they can study the brain and politics. These tools and methods enable researchers to test questions about the individual and behaviour in new ways, providing insights that were previously inaccessible. This ability has led to new knowledge in both neuroscience and politics. In what follows, the intersection of these two disciplines, neuropolitics, will be studied to demonstrate the advances resulting from this interdisciplinary work.

The structure of this paper closely follows the path of my research journey. First, a general context of neuropolitics will be provided to situate the subject and my overarching method.

Then, the paper moves into the first of two literature reviews. The first, an orientating literature review is divided into two major sections, the methodological findings and the substantive findings. This review is exploratory and is meant as an introduction to the subject of neuropolitics. From here, the paper moves into a second literature review, the contemporary literature review. Again, the second review is divided into two major sections, the methodological findings and the substantive findings and then divided further based on key topics. Following the contemporary literature review, key methodological and substantive findings from both literature reviews as well as implications for the study of politics are discussed in the conclusion.

1.1 Context

One of the first studies purposefully integrating neuroscience and politics is attributed to research on the corpus callosum by Roger Sperry. Since then, the intersection of neuroscience and political theory has offered many insights (Schreiber 2017, p.115). This convergence of the areas of neuroscience and politics resulted in the field of study of neuropolitics, where questions of political theory are rigorously analyzed using the methods and findings of neuroscience to procure insights and add to the body of knowledge. As described by Dunagan, neuropolitics is, “a framework that allows us to re-imagine culture, power, and political subjectivity in the light of our increasing knowledge about the human brain and extended mind” (2010, p.56). Similarly, but with an increased emphasis on the mutually beneficial nature for neuroscience and politics, Connolly describes neuropolitics as, “the politics through which cultural life mixes into the composition of body/brain processes. And vice versa. The new neuroscience, while needing augmentation from cultural theory, alerts us to the critical significance of technique in thinking, ethics, and politics” (2002, p. xii).

1.2 Research Question

Given the context of an interest in interdisciplinary research and the value seen from the work of authors like Connolly, Sperry, Kahneman, and Westen, my research questions are, what are the implications of modern neuroscience for contemporary political science? What happens when you take what is being done and published presently in neuroscience and pose it as a challenge or a question in political science? I am drawn to these questions as they provide an interesting access point to the field of research that I am interested in studying; additionally, they provide an immense amount of room for discovery.

1.3 Overarching Method

My project greatly changed from the original conception to the final product. The gaps that emerged from my orientating literature review prompted diving deeper into the work of political psychology to answer my research question. This caused my project to take on the form of a two-stage literature review.

Stage one was an orientating survey of the subject of neuropolitics to learn the general content and history of the material. Stage two was a more focused endeavour studying contemporary political psychology to answer my question of what the implications are of modern neuroscience for contemporary political science. In each literature review section, I provide more detail regarding the method used for working with the available literature. Whereas with the orientating

literature review, I explicitly looked for references to “neuropolitics,” the contemporary review was grounded in what I learned from the first. Using the keywords, theories and subject matter from the orientating literature review enabled the design of a more robust second literature review which aided in answering my research question of what the implications are of modern neuroscience for contemporary political science.

2. Orienting Literature Review

2.1 Context

Today researchers and scientists have access to technologies that those of the past did not. Various methods are now available to study the mind and brain. As a result, a great deal of literature has emerged on neuropolitics. A vast number of neuroscientific methods which can be used for approaching the study are noted in the introduction to *The Affect Effect* by Neuman, Marcus, Crigler, and Mackeun, focusing on the dynamics of emotion in political thinking and behaviour (2007). In their work, they identify 23 theories from across neuropolitics, each purporting to be a different way of accessing what the brain has to offer (p.6, 2007). A sampling of the theories they identify include hot cognition (Abelson 1963), affective intelligence (Marcus et al. 2000), and the recurrent multi-level appraisal model (Spezio and Adolphs 2007). Additionally, as can be seen in *Essays on Neuroscience and Political Theory* edited by Vander Valk, there are several entry points from political theory through thinkers like Aristotle, Spinoza, and Hobbes, that benefit from the application of neuroscience (2012, Thiele, p.128, Martel, p. 153 & Johnston, p. 164).

For the purposes of the orienting review, the scope was limited to a body of research published between 2002 and 2017. I used the early temporal limit of 2002 as this was the year of publishing of William Connolly’s *Neuropolitics*. This seminal work paved the way for later research on neuropolitics. Connolly, a political scientist, and Darren Schreiber, a neuroscientist, are considered pioneers within the field of neuropolitics. The concentration of studies from 2002 to 2017 provided an understanding of the development of research of neuropolitics and insight as to where further research is still needed. Broadly the substantive findings discovered from this initial review of neuropolitics can be grouped into three categories: political messaging, political decision-making, and political social behaviour. In what follows, I will recount and assess the literature according to methodological and substantive findings.

2.2 Research Question

The research questions of the first literature review were straightforward in nature. The goal was to determine the roots of neuropolitics and whether it was a viable avenue of study. Guiding me throughout the orienting research review were questions like, “what is neuropolitics”; “how is neuropolitics studied”; “who is applying techniques from the study of neuroscience to politics, and how are they doing so”; and “what is the impact of applying techniques from the study of neuroscience to the study of politics”?

2.3 Method

The orienting literature review utilized the snowball sampling method to discover a variety of resources on the topic of neuropolitics to better inform my understanding of the subject, learn the

prominent themes and theories, and grasp the development of the material. My search for material was kickstarted by books and articles recommended by professors and advisors. This resulted in reading material like *Descartes Error* by Antonio Damasio, *Neuropolitics: Thinking, Culture and Speed* by William Connolly, *The Political Brain* by Drew Westen, and *Too Dumb for Democracy* by David Moscrop. From there, I turned to the works cited and further reading sections of these books to find other relevant titles. From this, I gathered a collection of material that aimed at explicitly investigating the human brain and politics.

2.4 Methodological Findings – Orienting Literature Review

From the orienting literature review, two key forms of methodology emerge: lesion studies and functional magnetic resonance imaging (fMRI). The latter is the more popular methodology, common throughout works in the orienting literature review. In contrast, lesion studies seem to be a methodology that has fallen out of style, appearing only in work from 2005.

2.4.1 Lesion Studies

The work of Antonio Damasio in *Descartes Error* showcases the methodology of lesion studies (2005). Lesion studies are those where portions of the brain are missing due to either trauma or sickness; researchers look at the effects these missing portions have on the individual. One of the most well-known lesion studies cases is that of Phineas Gage, the rail worker who had a tamping iron fire through his skull and brain. His case was extremely influential in understanding the composition of the brain and the effect that different areas of the brain have on human behaviour. Lesion studies are valuable as they can assist in isolating what different regions of the brain are responsible for. However, with lesion studies, it is imperative not to fall into a reductive trap of thinking that certain functions are unique to only one part of the brain. Different parts of the brain work together simultaneously to enable function.

2.4.2 fMRI

fMRI works by detecting and producing images showing blood oxygenation and flow within the brain. Blood oxygenation is representative of neural activity, as it is known that when the brain (or other parts of the human body) engages in higher levels of activity, an increased consumption of oxygen by cells is noted (Spezio & Adolphs 2007, p.87). The use of fMRI is present in Drew Westen's *Political Brain*, the collective work of Darren Schreiber, and Iacoboni and Zaller's work on political behaviour. Schreiber, considered one of the pioneers of neuropolitics, was also one of the first to engage functional brain imaging methods for political studies (2017, Schreiber, p.117).

2.5 Substantive Findings – Orienting Literature Review

2.5.1 Political Messaging

Studies of political messaging largely examine what accounts for one party being more successful than the other. The majority of studies focus on the United States and the idea that the Republican party has been more successful than its Democrat counterpart due to a better understanding of how the brain functions.

Key researchers in this area include Drew Westen and George Lakoff. Antonio Damasio largely informs the work of Lakoff and Westen. In his book *Descartes Error*, Damasio, a neuroscientist, sought to question the idea that the mind was purely rational and that emotion played little to no role. Through the use of lesion studies, Damasio produced the “somatic marker hypothesis,” demonstrating that emotions play a key role in rationality and the guiding of behaviour (Damasio, p.173, 2005). The works of Lakoff and Westen build on Damasio as their work is grounded in the idea that the mind is not a dispassionate machine but rather that emotions play a large role in our interactions and interpretations of the world. This understanding broadly affects the functioning of political parties and the garnering of votes.

In their respective works, *The Political Mind* by Lakoff, a cognitive scientist, and *The Political Brain* by Westen, a political psychologist, the authors seek to demonstrate the lack of success of the Democrat party in the United States. They argue that this can be attributed to the idea that, unlike their Republican counterparts, Democrats do not understand the minds of their voters. Republicans, according to Westen and Lakoff, understand that voters are largely emotional beings who respond to campaigns that hinge on emotionally compelling narratives (Westen, p.ix & Lakoff, p.8).

In contrast, Democrats believe that voters are unemotional and purely logical. Where the two authors differ is in the goal of their work. Whereas Lakoff provides a hypothetical work aimed at causing the reader to reconsider how we function socially and politically, Westen presents what reads as a strategic manual to be employed by candidates to ensure success, with data and case studies to support his work, akin to that of Machiavelli’s *The Prince*.

2.5.2 Political Decision-Making

In addition to his work on political messaging, Westen also works on political decision-making. To conduct his research, as shown in “Neural Bases of Motivated Reasoning,” Westen used fMRI studies to determine the neural correlates of motivated reasoning, decision-making, and political judgement (Westen et al. 2006, p.1955). By presenting subjects with reasoning tasks that required judgements about information that threatened their political candidate, Westen et al. could see active brain areas during the task (2006, p. 1952). However, Westen is not the only researcher working on the study of political decision-making. In “Emotional Processing and Political Judgement,” Spezio and Adolphs use Damasio’s somatic marker hypothesis in their proposal of how emotional processing in decisions can be thought of and studied (2007, p. 72).

With his mentors Marco Iacoboni, a neurologist and neuroscientist, and John Zaller, Schreiber produced an interdisciplinary study using functional magnetic resonance imaging (fMRI) technology. The study by Schreiber was conducted using political sophisticates and novices and demonstrated that political novices more heavily engaged their brain than sophisticates when thinking about politics. Iacoboni, Schreiber, and Zaller understood this outcome as the result that for political sophisticates, thinking about politics is second nature and requires significantly less commitment. Instead of employing a neural network requiring increased neural horsepower, the brain of the political sophisticate switches to what Schreiber refers to as the “default state network.” This, they reasoned, is why sophisticates can arrive at a decision quickly, whereas political novices take more time to deliberate (Iacoboni 2009, p. 250). In his studies, Westen is largely focused on what is known as affective neuroscience and how this motivates reasoning.

Affective neuroscience, also known as the cognitive neuroscience of emotion, looks to study emotion and its neural mechanisms. Schreiber, on the other hand, approaches the study from the perspective of cognitive neuroscience, which looks more broadly at the biological processes underlying cognition.

2.5.3 Political Behaviour

In addition to the specific treatment of political messaging and political discourse found in the studies of Westen, Lakoff, and Schreiber, examined within the study of neuropolitics research is also a study of individual's political behaviour. Beyond his work with Schreiber, in his book, *Mirroring People: The Science of Empathy and How We Connect with Others*, Marco Iacoboni presents his studies of mirror neurons and their impact on our interaction with others. Iacoboni posits that mirror neurons “deal with the physical aspects of self and others” and “are critical to our understanding of relationship[s]” (Iacoboni 2009, p. 257).

This research is important to understanding social relations within the community and with authority. Hindered by the limitations of imaging experiments, to carry out this study Iacoboni and his co-researcher Alan Fiske had to be creative with creating a social experience for their subjects to be tested with. Unable to put them in a room together and simultaneously complete the brain imaging, they hired a team of writers and directors and created video clips of social reactions to have their participants watch while their brain was imaged (Iacoboni 2009, p. 255).

2.6 Gaps That Emerged

This initial orienting literature review revealed several gaps that warranted further treatment. First, most of the research identified focused on the American context, which warrants the question of how this subject is being studied by others worldwide and whether the findings are replicable in other contexts. Next, on the subject of the findings, most of the research found through the exploratory literature review boiled down to a focus on communication, decision-making and behaviour, with few outliers. Additionally, the findings from this first set of articles and books are largely speculative, centering on “how neuropolitics could be used.” Moving forward, I would like to identify how and if neuropolitics is being used and whether it produces tangible, useful results. Finally, the last gap that emerges from the initial review is the question of what the state of affairs is in political psychology with regard to neuropolitics. As this area is closely aligned, it is reasonable to expect some crossover between the two study regions. With these questions in mind, this essay turns to the second contemporary literature review.

3. Contemporary Literature Review

3.1 Context and choice of dataset

To gain a better understanding of additional neuropolitical work that had been completed and that was being completed, the decision was made that it would be useful to conduct a second contemporary literature review of political psychology to ascertain if there were neuroscience elements present in the work being done in that field. This was done because of the gaps that emerged from the orienting literature review, including the heavy focus on the American context, the speculative nature of the work and the limited range of topics treated. Therefore, it was determined that a more detailed literature review was ultimately required.

The problem, however, is that the current literature is large and scattered. Due to this, the decision was made to utilize a proxy journal and analyze a ten-year portion. The choice was made to do a systematic literature review of the *Journal of Political Psychology*. The *Journal of Political Psychology* was chosen for several reasons. It is the official journal of the interdisciplinary International Society of Political Psychology – one of the main academic organizations devoted to the study of political psychology. It has been in publication for over 20 years and has been led by a number of well-regarded and high-profile scholars from the field of political psychology (including George Marcus and Rose McDermott). Moreover, it publishes articles that use a wide range of methods and explore a variety of subjects related politics and psychology. It is therefore considered as one of the foremost journals in the field and somewhat of a research agenda-setting/research agenda-reflecting journal when it comes to political psychology (and neuropolitics). To ensure that my dataset contained as much cutting-edge material on neuropolitics as possible, then, I decided to examine a 10 year period from 2010-2021. This resulted in a dataset of 646 total potential articles – 134 of which were ultimately determined to be focused on ‘neuropolitics’ (and thus fully analysed as discussed below)

While the output of a single journal over 10 year timespan is not guaranteed to capture everything important type of neuropolitical study, given the factors above, it is reasonable to believe that the chosen dataset nonetheless provides a highly representative sample of the main currents of research on neuropolitics over the last decade.

3.2 Review Method

To undertake the literature review, I began by reading every abstract of the articles published in Political Psychology from 2010 to 2021. This time frame was selected as it was thought to give an accurate picture of the more recent developments published in the journal and provide a historical pool of data to compare against. The choice was made to review the last ten years of work published in the journal, encompassing the most recent decade. It was believed that using this selection would capture current trends and a wide diversity of work published in the journal.

Initially, each publication of the journal contained six issues, but in 2014, a new seventh issue was added, *Advances in Political Psychology*. This additional issue was framed as a “special issue” and included in the annual groupings of issues published; thus, it was logical to include it in my survey of the work.

I organized the details of every article abstract into an excel sheet noting the issue number, year and title and then addressing the substance of each article. Articles were broken down by their topic, key argument, and whether they were “neuropolitical” (1 for yes and 0 for no). If articles were “neuropolitical,” then the research method and hypothesis, theory or key finding were included depending on the information available in the abstract. The categorization of neuropolitical was informed by the information learned during my first literature review of neuropolitics. Initially, in the systematic literature review, all information was transcribed regardless of whether or not an article was neuropolitical. After looking at the initial 152 abstracts and noting all the information for each one, it was decided that this was unnecessary

and a full analysis was undertaken only for articles that were deemed to be focused on neuropolitics.

Each article abstract was analyzed for themes and for methodologies relating to neuroscience and the study of the brain and its processes. These themes represented a fairly wide variety, including a range of topics like decision-making, motivated reasoning, emotion, and mechanisms. For the methodologies, I looked for the use of specific tools (e.g., the use of fMRI) and the application of hypotheses pulled from neuroscience research and applied to political science. In total, from the 646 articles included in the timespan from 2010 to 2021, 134, or 20%, were coded as neuropolitical. After the initial subset of articles was delineated, each article was read and reviewed in its entirety. As such, the review that follows attempts to succinctly highlight common themes and theories that emerged from my systematic review of all of the neuropolitical content in the *Journal of Political Psychology* from 2010 - 2021.¹

3.3 Methodological Findings – Contemporary Literature Review

I will begin by discussing the ‘methodological learnings’ taken from this literature review. By ‘methodological learnings’ I mean the lessons we can take about the various methodological tools and approaches that political psychology has used to investigate neuropolitics (as distinct from the substantive findings and content about neuropolitics that these same studies have discovered...which will be discussed in section 3.4).

The interdisciplinary nature of the topic of neuropolitics gives researchers a wide variety of tools they can pull to study their questions. In neuropolitical research, the use of tools pulled directly from neuroscience and applied to questions of political science is commonly seen. In other cases, researchers need to get creative and use experimental designs to test their theories and find answers to their questions. Overall, there is a vast array of methodological tools to be utilized. In what follows, a number of the key methods that emerged during the contemporary literature review will be discussed. Not all methods from the review are included as the list is immense and could have an entire paper dedicated specifically to the study of the methods. As this paper aims to give more of a broad overview, we will visit only a handful.²

3.3.1 Implicit Association Testing

The implicit association test is used by many, including Albertson in their work on the effect of religious appeals and implicit attitudes (2011) and as well as by Sheets, Domke, and Greenwald in their work on how traits of Christian-ness relate to overall voter attitudes among others (2011). The way an implicit association test works is that respondents are rapidly shown a variety of different stimuli that they must classify into either positive or negative categories. Anthony Greenwald and colleagues developed this test. An implicit association test is understood to be of value because of the shared assumptions that what shapes behaviour and attitudes are cognitive unconscious processes. By measuring latencies in classification by respondents, researchers can

¹ Please see Appendix A for a table summarizing the findings of the Contemporary Systematic Literature Review.

² To explore the full list of methods uncovered in the Contemporary Systematic Literature Review please visit Appendix C.

understand respondents' implicit conceptual associations. The implicit association test is used in the study of biases and memory.

3.3.2 fMRI

As the process of fMRI was visited in the orienting literature review, I will not go as in-depth about how it works again. What is key to remember is that fMRI is a useful tool for researchers to measure neural activity and for understanding how the brain functions. In their work on neural processing, Casado-Aranda et al. demonstrate this technique's usefulness in neuropolitics research. They specifically seek to understand whether the neural processing of political information is biased by partisanship. To do so, they examine the neural correlates of positive messaging and corruption. Using fMRI, they can see which brain regions respond more when subjected to corruption and positive messaging (2020).

In another study, Schreiber and Iacoboni, two authors who initially came up in the orienting literature review, also utilized fMRI. Looking at race and norm violation, Schreiber and Iacoboni use fMRI to compare amygdala activity when exposed to either race or norm violation. This project allowed the researchers to explore neural mechanisms and provided evidence that norm violation appears to be the bigger driver of amygdala activity than race (2012).

fMRI is valuable to researchers studying neuropolitics because it can assist in producing an understanding of how the brain functions. It permits researchers to see the specific areas of the brain associated with various elements of human functioning and provides insight into deeper neural mechanisms.

3.3.3 The Study of Emotion

In the study of emotion, there are a variety of different methods used, such as surveys (see Dragojlovic, 2011), panel studies (see Jardina et al., 2021; Vasiolopoulos et al., 2018; and Ksiazkiewicz et al., 2018, as well as several others), path modelling (Kaakinen et al. 2021), and other experiments involving participant testing. What is common amongst methodologies in the study of emotion is the high frequency with which individuals are directly involved. According to Lynngard, the study of emotion is unique and perhaps difficult because of the methodological challenges involved (2019). These difficulties stem from the contentious relationship between the researcher, and the research object, which is, in this case, political emotion (Lynngard, p.1202, 2019). Nevertheless, researchers continue to work through this challenge and employ various methods leading to new and improved research.

3.3.4 Experimental Design

As seen, there are a variety of ways in which to study neuropolitics using pre-existing tools from both the fields of neuroscience and political science. However, previously existing methods sometimes cannot study the questions that a researcher poses. This results in experimental and quasi-experimental designs by the researchers to answer their questions.

One example of this is the research on trace decay and interference in memory done by Miller. To examine two hypotheses for memory failure, she designed a multi-stage study that enabled her to control participant exposure to information throughout the study. Being able to control exposure meant that differences in memory could not be attributed to varied initial uncontrolled

exposure and that all participants would be exposed equally and in the same way to the information (2013).

Experimental designs can also build on old methods, as in the case of Nai, Schmeil and Marie, who took an existing protocol and attempted to improve on it with modifications to remove exogenous factors that affected the data set (2017). Utilizing a pre-existing two-stage longitudinal study, Nai, Schmeil, and Marie added a script sequence that would allow them to better trace the stages of the survey and identify at what point a participant's opinion changed in response to the data presented (p. 142, 2017). By modifying a previous methodology, the group could study their identified phenomena and answer their questions.

When the tools to get the job done are unavailable, making modifications to existing methodologies and creating new methods assists researchers in neuropolitics develop innovative research protocols and designs that help them answer their research questions. What has been presented here are two short examples of how neuropolitics employs experimental design in the study of the subject. Other experimental methods were present in the contemporary literature review but did not ultimately fit into this paper, given time and length constraints.

3.4 Substantive Findings – Contemporary Literature Review

My systematic review of the literature also revealed a wide number of substantive findings (e.g. key topics, themes and findings) regarding neuropolitics that are highly relevant to the study of politics. In this section I identify and discuss those that were the most prevalent and important.

3.4.1 Emotion

As demonstrated by neuroscientist Antonio Damasio in his work *Descartes Error*, emotions have an integral role in human behaviour. Emotions are mental states that affect nearly everything, including human rationality, thinking and behaviour (2005, p. 173). Damasio mirrors Hume's well-known statement that "reason is and only ought to be the slave to the passions" (T2.3.3 415, 2007, p.266). Given the scope of the effect of emotions, it is only natural that their study would come to be incorporated into the study of political science, and it has been since the time of Aristotle. So why is it important to this paper, and what is the role of emotion in the study of neuropolitics? The value of neuropolitical research is that it brings new tools for investigating and evaluating phenomena. In the case of emotion, while it has been embedded in the study of politics since the beginning, the integration of the tools of neuroscience in the study of emotions and politics permits researchers to explore new avenues and gather answers to their questions using new methods. Understanding how the brain works leads to a better understanding of emotions; with this improved understanding we can refine the way emotions are studied in politics to gather better information and lead to discoveries. In what follows, we'll review how different facets of emotion are studied in political science with contributions from neuroscience.

The paper will cover the use of emotion as an instrument, negative emotion, positive emotion, and collective emotion. Emotional dysregulation is an additional area of emotion research that is not treated in this paper but that emerged during the systematic literature review. Few articles gathered through the systematic literature review addressed this topic directly, but it is an interesting emerging topic and will warrant further treatment in future.

3.4.1.1 The Use of Emotion as an Instrument

Emotion is an instrument which can be manipulated to achieve desired outcomes. Both authors discussed in this section would agree on this. The emotion of citizens can be used to create a sense of loyalty to one's country, or they can be manipulated to polarize public opinion, potentially affecting voting choices or citizen behaviour.

In the article "How Emotional Frames Moralize and Polarize Political Attitudes," Scott examines how emotional appeals are utilized by politicians to produce salient moralized political issues creating social and political polarization among citizens (2019, p.76). Moralization and polarization can be triggered by using what are known as "other-condemning" emotions like anger and disgust. Through issue framing, public opinion is manipulated to suit the desired outcome of politicians, which in the instances observed by Scott, is used to motivate political engagement (2019). One limitation of this instrument that Scott addresses is the lack of clarity as to whether political issues that are already highly emotional and politically salient can be manipulated and moralized through framing (2019, p. 87). This serves as an example of how emotions can be used to affect citizens on specific policy issues.

Emotions can also be used instrumentally in a broader fashion, like in the case of Thailand and affective self-nationalization. In an article by Gaber, it is explained how self-nationalization is curated effectively in Thailand. Using ethnographic fieldwork in Thailand, Gaber connects with individuals about their nationalizing practices. State-initiated rituals like standing for the national anthem twice per day no matter where you are or what you are doing at the same time are a collective process. Individuals perform their nationalizing together, holding one another accountable. After a certain point, the nationalization becomes so embodied and ingrained that even if one is alone, they feel compelled to perform their state-initiated rituals (2020, p. 338). Using emotion to convey nationalist propaganda, the individual's connection to the country is fortified and ensures a nearly unbreakable bond (2020, p. 324). This helps to create submissive citizens with heavily entrenched loyalties to their state.

As Gaber and Scott reveal, citizens are subject to the use of emotion as an instrument. This is often done through the use of emotional narrative frames but also through the initiation of rigorous rituals. Loyalty and support can be curated by making citizens feel a certain way.

3.4.1.2 Negative Emotion

Negative emotion takes up significant real estate in the sub-area of emotion. What is meant when referring to negative emotions are anger, anxiety, guilt, and fear. These are the emotions that most people would typically categorize as "bad." Given space and time constraints, it is impossible to discuss each negative emotion in depth, but in what follows, I will provide a snapshot of research in the two most prominent areas of negative emotion studies.

3.4.1.2.1 Anger

As an emotion, anger is motivating and has a strong conditioning effect. It is a reactive emotion prompted by the actions of others and by events. Most researchers would agree upon this.

Two of the most common ways identified in which anger conditions are policy and party support. As demonstrated in work by Jörg, Schmuck, and von Sikorski, using a quota-based online experiment, when it comes to anti-Muslim policy support, anger and fear are the stronger conditioning factors (2019). In another work by Marcus, Valentino, Vasilopoulos and Foucault, it was identified that in the present, the key elements conditioning support for the far right are emotions like anger and fear (2019).

In terms of motivation, anger serves as the foundation on which support for far-right politics and parties is built (Vasilopoulos, Marcus, Valentino, and Foucault, 2019). Anger is a provocative emotion, inciting passion in the individual. It has the power to make individuals act. In a study by Suhay and Erisen of the drivers of motivated reasoning, it is demonstrated that anger erodes rational thinking in that it motivates individuals towards an evaluative bias. This bias causes them to disfavour the views of others and instead favour their own, even in the face of factual information that disconfirms their view (2018).

Anger is a powerful emotion. When it is engaged, the effects are widespread. As seen in the brief overview of a subset of the research being done, anger is a powerful conditioner and motivator; as such, it can cause people to act in extreme ways at times.

3.4.1.2.2 Anxiety

The second prominent emotion under the negative emotion subset is anxiety. Whereas anger is a reactive emotion, anxiety can be thought of as more of a proactive emotion. It is typically experienced in anticipation of something. It can be prompted by the actions of others or by events, but this is less typical.

The effects of anxiety on individuals are varied. In political studies, the key findings can be identified as; that anxiety creates and increases resistance in individuals and that anxiety has an impairing effect on cognitive processing and memory function.

On the topic of resistance, Nai, Schemeil and Marie demonstrate that anxiety can increase resistance to persuasion in individuals. They find that the effect of anxiety in creating and increasing persuasion is moderated by political sophistication (2017). Their findings align with Affective Intelligence Theory and show that anxiety has a negative effect on the Big Five Personality trait of 'Openness to Information' in that it decreases whether an individual will be receptive to new information (2017).

In terms of cognitive processing and memory function, several authors show how anxiety produces impairments, including increasing biased information processing, interrupting memory, and impacting decision-making. In a study on responses to cyber-attacks, Cheung-Blunden and Ju show that anxiety produces barriers for individuals when it occurs (2016). In the face of anxiety, individuals recall less information than their non-anxious counterparts. This is due to inefficient information processing leading to poor cataloging of information (Cheung-Blunden, & Ju, 2016). Additionally, in Gadarian and Albertson, it is seen that while anxious individuals look to procure more information, they are unknowingly attracted to more threatening information leading to biased information processing (2014).

Anxiety affects individuals' cognitive processing on a broad level. This leads to resistance in individuals and impairments to everyday functions like decision-making and memory-making. Like all emotions, anxiety depends on the individual and manifests in various ways and degrees.

3.4.1.3 Positive Emotion

In the study of emotion in political science, most research focuses on negative emotions and their impacts. The result is that there is little known about the role that positive emotions play.

In an exploratory article, Zomeren looks at how many positive emotions can be differentiated and what role positive emotions play in political science compared to their negative counterparts (2021). By reviewing other literature, Zomeren can distinguish beneficial implications for positive emotion research in politics, such as predicting student participation in protests, community participation in gatherings, and that positive emotions are stronger amongst political activists (2021, p.174). For Zomeren, this points towards the possibility that there is untapped potential for the study of positive emotion.

3.4.1.3.1 Empathy

In another study relating to positive emotion, “The Empathetic Foundations of Security Dilemma De-escalation,” Baker demonstrates that harnessing empathy's power can be a useful method for de-escalation security problems. Baker also points to, though, that empathy is undertheorized and needs further research. He attempts to contribute towards fulfilling this gap between empathy and security dilemmas. Baker shows that empathy can moderate views, which in turn has the benefit of opening dialogue, humanization of the other, and approaching issues in IR as shared problems instead of as a basis for being adversarial (2019, p. 1259).

3.4.1.3.2 Compassion

Beyond empathy, compassion is another positive emotion that has become the subject of study. Two articles emerge from the systematic literature review on the subject of compassion. However, it is only in the study of the emotion itself that they share any similarity. The first article by Delton, DeScioli, Peterson and Robertson studies how compassion is affected by absolute and acute needs and, in turn, what effect this has on welfare attitudes and policy (2018). In comparison, the second article, by Blinder and Rolfe, seeks to test whether compassion can account for the political gender gap (2018). In the article by Delton et al., they find that compassion is moderated by the heuristics of caring. Compassion is increased in cases where people experience sudden misfortune due to the acute needs heuristic. Compassion can also be seen to be increased for those requiring welfare benefits due to making less money due to the absolute needs heuristic (2018, p. 918). Rolfe and Blinder’s article questions whether compassion is itself a moderating variable accounting for the political gender gap. They find that females’ compassion towards others is not linked to their partisan identity and therefore do not account for the gender gap (2018, p. 900).

3.4.1.4 Collective Emotion

Collective emotions are those shared by a particular group arising out of ongoing circumstances or a specific event. They help bond the ingroup against a perceived outgroup and are an important element of social identity. Collective emotion is an interesting subset of emotion research and can encompass positive and negative emotions. I’ve selected to highlight it within

this project because it is an essential category in the study of emotion in neuropolitics as it directly relates to group behaviour. The key areas of research in collective emotion highlighted during the systematic literature review are narrative formation and manipulation of collective emotion.

Eberle and Daniel argue that narrative success is largely contingent on collective emotion. As collective emotion is a way to embed narratives in cultural contexts and help reproduce values in individuals (2019). In their work, as many from the neuropolitics field do, they demonstrate that politics and affect are closely intertwined. The use of narrative formation utilizing collective emotion is not specific to one area of the world. As Clément, Lindermann and Sangar show, the “narratives are not Western-specific but indeed present in all contexts” (p. 992, 2017). Their research specifically looks at the hero-protector narrative and how this formation hinges on the use of collective emotion. By stimulating emotions, things like the use of force can be legitimized, leading to it being valorized instead of rejected by the population (p.998, 2017).

The research on narratives, as seen in Clément, Lindermann, and Sangar, also demonstrates how collective emotion is used in the manipulation of emotion. As the government seeks to gain support for its actions, they use carefully curated collective emotion to ensure that its actions and policies will be supported rather than rejected by the population (2017).

An outlier in collective emotion research is the work of Montiel and Uyheng. These authors take an exploratory approach to the subject of collective emotion and seek to map it as it relates to the Duterte government of the Philippines. Montiel and Uyheng utilize social media spaces during Duterte’s federalism push to study the emotional climate and how it is affected. Through their work, they find that links emerge between “populism, collective emotions, and mediatized democratic participation” (Montiel and Uyheng, p.749, 2020). They find that populist rhetoric, when posed to manipulate collective emotion, has a widespread effect and can be used to create or intensify citizen polarization.

In the scope of neuropolitics, collective emotion is just beginning to emerge as an area of study, but it remains important. It is a key element in narrative formation, with narrative hinging on provoking and playing on the ingroup vs outgroup emotional divide. The manipulation of collective emotion will continue to be an interesting and pertinent area of study to determine long-term effects.

3.4.2 Genetics

It is unsurprising that genetics is a sub-discipline of neuropolitics. Since genes contain a great portion of the information that makes individuals who they are, it is reasonable that political researchers would turn to genetics to determine what can be uncovered about the political self via this medium. It is an area of inquiry that has been identified as one of interest and hypothesized to be of value to the study of politics. While research about behavioural genetics is not new, the application of this course of study to the area of political science is underutilized (Smith et al. 2011, p. 370).

From the systematic literature review of neuropolitics in political psychology, what is gathered about this area of study is that it remains largely in stages of infancy in this discipline. Shared

amongst the research in this area are the attempts to find a direct link between an element of political study (Smith et al. 2011, Oskarsson et al. 2015, Ksiazkiewicz et al. 2016) – for example, behaviour, orientation, attitude, preference – and genes. The success of these attempts varies. For some, the logic of the connection between genes and political elements is a reach. For others, there is an increased degree of justification fortifying the connection between the two areas. Studies of genetics from a political science perspective lean heavily on the work done by individuals from the behavioural genetics field. As with other subgenres of neuropolitics, this can become an issue if generalizations are made due to a lack of an in-depth understanding of the subject. This is somewhat seen in the articles gathered from the systematic literature review. In most cases, the authors are not behavioural geneticists; rather, they build on previous work completed and extend it into political science. While it is beneficial to political science to expand research into this area, it is detrimental when the research is incomplete or attempts connections that may be incomplete.

Smith et al. suggest that a route can be traced between genetics and personal political attitudes. They write that to do so requires explaining an extensive causal chain. Smith et al. limit themselves with the reminder to readers that a reductionist perspective only taking into account the role of biological characteristics would fail to account for the impact of environmental factors shaping individuals' political attitudes. Smith et al. hypothesize that the heritability of specific issue attitudes is mirrored in the heritability of general orientations (2011). This connected heritability, however, is only discussed at a high level, with the authors pointing towards other research to make up the steps of their described extensive causal chain. In their article, Smith et al. focus on what they call “bedrock social issues” as a forgotten part of the causal chain linking genes to political orientation (2011). The reason for a focus on this section is due to this stage of a “universal set of bedrock principles” being the cause for the “most limit[ing] acceptance of a biological basis for politics” (Smith et al. 2011, p. 388). Utilizing two empirical tests, a survey and an implicit association test, the researchers attempted to confirm a selection of the key causal relationships from their conceptual model. There is a disconnect between the study of “bedrock social issues” and the claim of the link between genes and political attitudes. The authors explain at the outset that their paper does not cover “genotype to phenotype,” but by focusing solely on one piece of their conceptual model, the others are left wanting explanation (Smith et al. 2011, p.371).

Like Smith et al., Oskarsson et al. look at delineating a pathway between genetics and a political element. Specifically, Oskarsson et al. seek to study the linkages between genes and political orientation. In contrast, Smith et al. attempt to assert a direct linkage and outline the causal chain. Oskarsson and his colleagues develop an exploratory study to examine political orientation's genetic and environmental causes to broaden the understanding of political etiology. For this study of political etiology, the authors utilized a dataset of 1000 Swedish male twin pairs. The use of the twin study as a methodology in genetics research is popular. The use of monozygotic (identical) twins provides researchers with an ideal canvas for studying pathways from genes to political attitudes and orientations. The article by Oskarsson et al. considers that the formation of fundamental psychological traits like cognitive ability predates the formation of political attitudes. In combination with this, the authors highlight that in previous studies, cognitive ability has been found to be highly heritable. Connecting these two concepts, the authors propose that

“a causal relationship may go from genes to cognitive ability to political orientations” (Oskarsson et al. 2014, p. 652).

Missing from Smith et al. is an explanation of how genes can be said to affect political attitudes. In the Oskarsson article, this is remedied by explaining several approaches used to determine how genes affect political orientations. This is key because, as both Smith et al. and Oskarsson et al. identify, political attitudes, traits, and orientations are removed from the genes. In their article Oskarsson et al. suggest two approaches. The first approach involves comparing the variable of interest with molecular genetic variation to look for associations. The second approach they describe is to look for endophenotypes or what they call “causal mediators.” Endophenotypes result in phenotypes otherwise known to laypeople as behaviour; these endophenotypes are caused by genetic variants (Oskarsson et al. 2014, p.651). Following this approach creates a direct line from gene to behaviour. It is the second approach that Oskarsson employs in their twin study.

Against the background that connections have been confirmed between personality traits and genes as well as personality traits and political ideology Ksiazkiewicz, Ludeke, and Krueger determine there remains a gap in the study of genetics and political ideology, namely, what variables contribute to genetic variance in ideology? The approach of asking what causal mediators determine how genes affect political attitudes and orientations is a common one, as seen in Oskarsson et al. In their article Ksiazkiewicz et al. examine how different cognitive style variables may act as mediators between genes and politics (Ksiazkiewicz et al. 2016, p. 762). To do this, they utilize a twin study of monozygotic and dizygotic twins to examine the genetic variance. Ksiazkiewicz determined that elements of cognitive style are heritable, linked both through genetic and environmental factors. Additionally, they demonstrate that cognitive styles are linked to Big Five personality traits, specifically the trait of openness. Big Five personality traits are an agreed upon taxonomy in psychology trait theory. These traits have been previously confirmed as being heritable. Ksiazkiewicz et al. confirm that there are shared linkages between Big Five traits and cognitive style, but the path from genetic variant to phenotype for cognitive style is not the same as that of the Big Five traits (Ksiazkiewicz et al. 2016).

Beyond their study Ksiazkiewicz et al. recommend the implementation of longitudinal studies in further research to determine if outside factors beyond simple genetic heritability influence political attitudes. Specifically, they recommend examining the moderating effect of environmental factors from different political, economic, and social contexts (2016, p. 772). The goal of Settle, Dawes, Loewen and Panagopoulos is to encourage experimental approaches, including biological or genetic covariates. Their recommendation is based on the notion that there are interactions between predispositions influenced by heritable factors and the environment of individuals. In their study, they measured genetic moderation using their field experiment and attested that their experiment is one of the first to attempt to do so. Their goal is that their research design may provide a template for future researchers to utilize biological information in the conduction of field experiments as the approach adds dimension to studies (2017).

3.4.3 Cognitive Processing

Cognitive processing refers to how the brain handles the information that it receives. This includes how it is used and stored. Studies of cognitive processing examine not only the basic mechanisms of processing but also what factors affect and impair it. The systematic literature review revealed research on a variety of topics related to cognitive processing, including bias, decision-making, cognitive closure, motivated reasoning, priming and memory. In this paper, I delve further into motivated reasoning and memory, as these are two of the topics that appeared most frequently during the study.

3.4.3.1 Motivated Reasoning

First and foremost, motivated reasoning is the study of how emotional biases affect decision-making or the passing of judgment. Rather than the individual basing decisions or judgements on provided evidence, emotional biases cloud rational processes causing judgements and decisions to be based on desirability instead. This is an important topic in political decision making as seen in the first literature review with Westen's work on neural bases of motivated reasoning. Within the *Journal of Political Psychology*, motivated reasoning again emerges as a key topic from neuropolitics, where it is questioned, applied and put to the test in examining how individuals form opinions, think politically, evaluate elections, and consider elections candidates.

Motivated reasoning, a major part of an individual's decision-making, is nestled under the larger umbrella of emotion or affect studies. It is part of the new enlightenment view that understands reason and emotion as two elements functioning in tandem as opposed to earlier conceptions that pitted reasoning and emotion against one another. Emotions strongly impact decision-making skills, often unconsciously overriding reason, logic or presented evidence.

The theoretical framework of motivated reasoning is a useful tool. Its application has value for understanding party support, candidate preference and understanding partisan influence, among other benefits. In their work on public opinion formation, Leeper and Slothuus utilize the theoretical framework of motivated reasoning in their article "Political Parties, Motivated Reasoning, and Public Opinion Formation" to clarify understanding of citizens' political reasoning and decision-making. They outline a series of conditions that may drive motivated reasoning. The first condition is that there are a variety of directional motivations the individual may be subject to – this includes their identity or previously held attitudes (2014, p. 143). Accuracy motivation is a secondary condition that drives motivated reasoning. As individuals aim to be correct about a conclusion, they may forego evidence that is incongruent with their conclusion (2014, p. 144). Finally, the constraints of reality can condition motivated reasoning, where either a balanced or a biased environment can influence the conclusions drawn by an individual (2014, p. 145). Leeper and Slothuus recommend further research in the area of what drives motivated reasoning for citizens.

When combined with other frameworks, the theoretical framework of motivated reasoning can help reveal the multiplicity of factors affecting political issues. In an article investigating voter judgements of candidate authenticity, Pillow, Crabtree, Galvan, and Hale utilize motivated reasoning and correspondent inference theory to assess the interaction between the partisan preference of voters and candidate tools like unfettered speech and strategic impression management (2018). As seen in previous work, motivated reasoning has a moderating effect on

the products of unfettered speech and strategic impression management by candidates; voter perception of candidates and their authenticity is only marginally affected due to the strong influence of motivated reasoning (2018).

In “Party Support, Values, and Perceptions of Electoral Integrity,” Flesken and Hartl show that even in the face of authoritarian values, it is difficult to sway individuals from their emotionally biased motivated reasoning. When confronted with authoritarian values, individuals are likely to seek more information. Yet, this effect results in stronger political polarization because their previous political leanings and emotional state bias their reading of new information (2018). This is attributed to the individual need to accept information that confirms what they previously knew or believed and reject information that is incongruent with their beliefs. The effect of motivated reasoning is strong and has a moderating effect on all information processing, making the process of increasing accuracy difficult.

What can be extrapolated from the research on motivated reasoning is that with ideas and opinions firmly grounded in emotional beliefs and motivated reasoning, it can be very difficult to change individuals’ notions. This becomes a problem when an individual holds a false or unsupported belief. These beliefs originate in personal opinion and are often projected onto the rest of the population, further confirming for the individual that their notion is correct. The bias in individual processing means that even frequent exposure to accurate political facts or the news cannot reduce incorrect assumptions (Dvir Gvirsman 2015, p. 730).

While many argue that individuals as political beings are largely subject to the perils (if one wishes to call them that) of motivated reasoning, the next set of articles this section of the review looks at argues that perhaps the situation is not entirely removed from the conscious individual’s control.

In their article Redlawsk, Civettini, and Emerson, confirm that in line with the commonly agreed upon theory of motivated reasoning, an individual's political decision-making is biased by their emotional predisposition and that individuals will ignore information that is incongruent with their previously held evaluations (2010, p. 568). However, they argue that this can only occur until a certain point. In the face of a certain degree of incongruent information, unconscious motivated reasoning is abandoned, and individuals begin reasoning logically. This is called the affective tipping point (2010, p. 564). Redlawsk, Civettini, and Emerson test this against candidate evaluation, proving that despite contradictory information, existing evaluations will attempt to be maintained as a product of motivated reasoning. Still, when incongruencies grow too large, previous positive evaluations fail and facts and evidence begin to be understood (2010).

Flynn, Nyhan, and Reifler also explain that false motivated reasoning can sometimes be corrected by other means, such as using an “ideologically sympathetic source” to deliver corrective information or presenting corrective information as graphics instead of text. Finally, rather than simply refuting the false belief, providing an alternative account seems to have success in correcting inaccurate motivated reasoning (2017, p. 131).

In another effort to reduce the effect of motivated reasoning, Már and Gastil attempt to approach the problem by looking for the boundaries of motivated reasoning and forming a solution from there (2020). Building on the idea of an affective tipping point, Már and Gastil hypothesize using minipublics made up of citizens and disseminating accurate information to correct inaccurate motivated reasoning (2020, p. 108). While it lacks a direct link, one can also derive a connection between Flynn, Nyhan, and Reifler's idea of using ideologically sympathetic sources and the idea of minipublics. The citizens making up the minipublics and those receiving the disseminated information may not hold the same ideological values. Still, there is a connection between the two groups in that they are both citizens and are affected by the same plights. This is perhaps a better way of approaching the issue than having an expert disseminate the information, as they could be written off by the individual as biased or going against the citizen's cause. In testing their hypothesis, Már and Gastil found that the circulated work of the minipublics possibly induced an accuracy motivation in the citizens. This is based on the fact that the ones who should have been most resistant to accurate information improved the most. Both test groups' "accuracy scores" were found to have improved during the experiment (2020, p. 122). The work by Már and Gastil demonstrates that motivated reasoning can be subverted, and incorrect systemic biases can be corrected.

The addition of neuroscience research in politics has demonstrated with regard to motivated reasoning that various forms of motivated reasoning impact all individuals. Our systemic emotional biases compel us to desire certain outcomes and believe in opinions and judgements regardless of their accuracy. However, what can also be seen is that motivated reasoning is merely a facet of the individual decision-making process. People are not either motivated reasoners or logical decision-makers; they are both. The threshold between the two sides can be navigated via affective tipping points, corrective information received from sympathetic sources, and the presentation of information in various mediums, i.e. graphics as opposed to text.

3.4.3.2 Memory

Memory is the subset of the brain responsible for encoding, storing, and retrieving the data and knowledge that individuals acquire in their everyday lives. The information stored in our memory and the ability to store information for the short and long term is a key part of our functionality. This is proven by the difficulties that arise when individuals experience short- or long-term memory loss due to injury or disease. Memory affects decision-making, planning abilities, the shaping of identities, and learning, and it is an integral part of who we are. Individuals have both implicit memories and explicit memories. Explicit memories include people's names, birthdays, and other factual information. In contrast, implicit memories are based on procedural type information, like how to write an essay or drive one's car. Both types of memories are key to the day to day functioning.

It is generally agreed upon that at a high level that there are five main steps to the creation of memory: sensing, encoding, consolidating, storage, and retrieval. These steps are the same for both long-term and short-term memory. The sensing stage is where the individual first takes in the information. Next is the encoding stage, where the brain is passed the information from the senses; it now becomes the brain's task to attempt to make the information that has been brought in palatable. To do this the brain selects the imperative information, "editing out" what is merely an everyday occurrence and unlikely to be recalled later. The consolidation stage allows the

brain to strengthen the information about the memory itself. This makes the process of recall easier later on. After the information has been sensed, encoded and consolidated, it is stored. In the storage process, traces of memory are left like breadcrumbs to assist the brain in rebuilding the memory later on if it is recalled. When the first four steps proceed without issue, retrieval is possible. In the retrieval stage, by accessing memory traces, the individual can bring forward memories – the more frequently a memory is brought forward, the stronger it becomes.

The formation of memories is a process that can be affected by several problems. As we will see from the studies of memory in the *Journal of Political Psychology*, when the formation of memories is interrupted, there are adverse effects on the individual's political decision-making and behaviour. Studying memory helps improve our understanding of learning and information processing. This is valuable for politics and has application in individual policy knowledge and the retention of campaign information. In what follows, three articles examine how memory can be improved and worsened and how this affects political science.

Beginning with Miller, in “The Effects of Scandalous Information on Recall of Policy-Related Information,” she examines the research question of whether scandalous information interferes with an individual's memory of policy information. Specifically, whether memory for campaign information is facilitated or impeded by the negative exposure to scandalous information (2010, p. 889), as discussed, interruptions to the formation of memories can have negative ramifications affecting political decision-making and behaviour. Miller proposes two hypotheses regarding this question. In one regard, the effect of scandalous information could be that it interferes with memories that had previously been stored for a candidate because the scandalous information is more exciting to the brain, thereby gathering an increased amount of attention. On the contrary, memory storage for the candidate may be positively impacted.

Drawing reference to the associative network theory of memory, Millar proposes that the scandalous information may add to the associative network, thereby facilitating the recall of information for the candidate (2010, p. 889). The associative network theory is psychology and neuroscience's most widely accepted model of memory. According to the associative network theory, concepts are represented as nodes within the brain. Between these nodes are linkages creating connections amongst the different concepts helping to strengthen the overall memory.

To test her hypothesis, Miller utilized a longitudinal experiment where participants were exposed to policy-related information about a candidate. The control group read a series of articles articulating a candidate's positions, and the treatment group, in comparison, read the same articles except for the final article, which was replaced by a salacious scandal article. After reading the series of articles, the participants filled out a survey to recall information about the candidate, their positions on issues and evaluate the candidate (2010, p. 892, p. 894). Per her second hypothesis, the group of participants exposed to the scandalous information was able to recall the candidate's policy positions. For Miller, this demonstrated that contrary to commonly held belief reflected in hypothesis 1, scandalous information facilitates the memory of policy information for individuals instead of negatively affecting it.

Miller's research on memory is again represented in the *Journal of Political Psychology* in 2013 as she once again looks at the ways in which memory for policy issues and campaign

information takes place in her article, “Failing to Recall: Examining the Effects of Trace Decay and Interference on Memory for Campaign Information.” In this article, Miller asks the root cause of voter memory for campaign information being so poor. She examines two possible factors that could be said to contribute to the issue, trace decay and interference. Trace decay theory involves the memory traces that are created in the storage phase of the memory formation cycle. This theory simply posits that these memory traces gradually disappear over time. The disappearance can be attributed to the memory not being recalled frequently, causing connections to fade.

Additionally, the length of political campaigns can be said to be a major factor in the fading of memory traces, as campaigns can span months to years. The second theory, interference, is predicated on the notion that old memories or memory traces may be replaced by new information, making it impossible to recall the old information. When this occurs, an individual cannot trigger the memory trace necessary to recall the large associated piece of information, thereby making the memory inaccessible.

To test these factors, Miller used an experimental design where participants were asked to read a series of newspaper articles on a candidate. From there, participants were assigned to either the control group or one of the delay or interference groups. The control group proceeded directly to a survey where they were asked to recall candidate information. Those in the delay condition were asked to wait two minutes. After a period of waiting, they were then asked to complete the same survey as the control group. Those in the interference groups were further divided into neutral, positive and negative condition groups. Depending on their assigned group, they were then asked to read further information (either neutral, positive, or negative). After further reading, the interference groups were asked to complete the conclusion survey (2013, p. 295). The assignment to experimental conditions had a significant effect on the degree to which each group was able to recall candidate information. The control group had little difficulty recalling the information.

In contrast, those from the delay group recalled slightly less on different individual measures, but the two treatments were the same for the composite measure. For the interference groups, recall was generally lower than in the control group but not significantly (2013, p. 297). When the delay and interference groups were compared, there was no significant difference in the recall of information. For Miller, this suggests that trace decay and interference have similar effects on memory (2013, p. 297).

While this study provides an interesting glimpse into the potential effects of trace decay and interference on memory, it requires additional scrutiny. To improve the study on trace decay, it would seem reasonable to have longer periods between learning the information and being asked to recall the information. To modify the experimental design, one could test the amount of information recalled by the delay group at the two-minute delay mark, after a two-week delay, and again after a two-month delay. This would perhaps allow for an increasingly robust analysis of the effect of trace decay.

In the final article that this essay aims to examine from the memory subset, we see what happens in the age of constant internet access and how this affects memory. In “Googling Politics: How

Offloading Affects Voting and Political Knowledge,” Kleinberg and Lau look at how voting behaviour and political knowledge are affected by the phenomenon known as offloading. In “offloading,” rather than committing information to memory, individuals utilize the internet to store information that would otherwise have normally been stored in the brain. A product of the modern age, this phenomenon is reminiscent of being told as a child that you won’t always have a calculator later in life, which is why it was important to learn how to add, subtract, multiply, etc., without one during math class. While one might presume this phenomenon of offloading makes people dumber, as Kleinberg and Lau demonstrate, those who rely on offloading “free up” more space in their working memory, giving them an increased available processing capacity (everyone is a computer), thereby in a way “making them smarter” (2021).

Kleinberg and Lau study this phenomenon using two distinct information environments and a 10-wave panel study (2021). One set of participants was placed in an environment conducive to offloading, whereas the second group was placed in an environment that did not support offloading and instead relied on memory. Those that were subject to the offloading condition as opposed to the memory condition revisited the available information and were able to make more well-informed decisions. Those in the memory condition were subject to only what they could recall by the end of the testing, which was a more limited subset of information, causing their decisions to be less informed and less accurate than those from the offloading condition. Kleinberg and Lau go so far in their essay as to say that, “the integration of externally stored information into people’s cognitive systems effectively makes them smarter” (2021, p. 107). Still, I think that this remains up for debate.

As Kleinberg and Lau demonstrated, without the burden of retaining the information presented in the experiment, participants had an increased capacity for processing the given information. Reflecting on the deeper reason why we couldn’t use a calculator in math class, there is something to be said for training your brain to process information. While in most modern circumstances, a computer-esque device with internet capacities is available for the individual, I think training one’s brain to accommodate both storing and processing information remains salient.

Memory is a key function of the brain aiding in the learning and processing of information. As seen in the sampling of articles from the *Journal of Political Psychology*, researchers are interested in testing this function in various ways. As we have seen, memory can be improved and deteriorated by external factors, as well memory is subject to fading over time. Beyond the days of mnemonic devices, the article of Lau and Kleinberg hints at how memory may be aided and improved in the future with contributions from neuroscience.

4. Conclusion

Given the length of the above discussion, I will keep this conclusion very brief. In sum, the most important findings of my literature review are the following:

- Key methodological findings from orienting literature review:
 - The two most prominent methods that emerged were lesion studies and the use of fMRI with the former method being far less popular. The use of fMRI in works from the orienting literature review was largely exploratory and required further research to consider findings as conclusive.

- Key substantive findings from orienting literature review:
 - The substantive findings from the orienting literature review fall neatly into the sub-categories of political messaging, behaviour and decision making. Most of the research is from the American context and there is a general idea found in each of these sub-categories that Republicans have a better understanding of the neurological and emotional states of individuals that Democrats that they wield to their advantage.
- Key gaps in orienting literature:
 - There is a lack of a global context, most research focuses only on the American context.
 - The work is largely speculative hypothesizing where the field of neuropolitics could go.
 - There is little discussion of how neuropolitics work fits in with political psychology, a closely related discipline.
- Key method findings from contemporary literature review:
 - The use of methodologies like fMRI testing and implicit association testing in political science are innovative and interesting as they provide new insights and pathways to understanding the brain. What is significant however is the degree of experimental design being used. To answer questions, researchers are developing new methods and combining existing methods in creative ways building on previous designs to achieve their goals.
- Key substantive findings from contemporary literature review:
 - The subject of emotion is a significant area of study and there is a particular focus on negative emotion and its effects. Emotion has moderating effects on cognitive processing affecting many cognitive processes like how decisions are made or how information is interpreted. Collective emotion is an important emerging field.
 - Genetics is an area of interest but not a key focus for many at this time. An obstacle to overcome is connecting genotype to phenotype in a way that can be mutually agreed upon and that takes into account the presence of environmental moderating elements.
 - Of interest to many is the variety of forms of cognitive processing, but most relevant includes the processes of how we learn or retain information as well as how we make decisions. Both of these processes change how the political animal functions and both processes are affected by a myriad of factors. Manipulation of cognitive processes, both moderation and exacerbation, through emotion, development of biases and among other strategies remain salient amongst researchers.
- Key gaps in contemporary literature review:
 - Areas like genetics, positive emotion and emotional dysregulation are underrepresented at this point in time.
 - In genetics this seems attributable to that at present it remains a world of possibility instead of practice due to the lacuna between gene and behavioural output. As the connections between genotype and phenotype become clarified I believe this may be an increasingly popular topic of research.
 - With regard to positive emotion, it is unclear why there is a dearth of research. I hazard two possible hypotheses. One, positive emotions do not typically trigger

extreme behaviours in the same way that negative emotions do. As such, there is perhaps less reason to study positive emotion. Second, there is simply possibly less positive emotion than there is negative emotion to study. The world, unfortunately, is fraught with negative emotion and it causes people to act. But by studying negative emotion, conceivably the degree of negative emotion could be reduced (hopefully) leaving more room for positive emotion that can then be studied.

- In terms of emotional dysregulation, only one article emerged. The emotional dysregulation was present in veterans and attributable to their time spent in conflict zones. It will be interesting to see if more research is done in this area.
- Key implications for study of politics:
 - Interdisciplinary research, like neuropolitics, is imperative. It offers new insights and avenues of study for researchers.
 - Our emotions play a significant role in all facets of our lives, humans are not simply logical, rational beings and to study humans from such a perspective is a detriment to research.
 - Knowing how our cognitive processes function and what affects or interferes with this functioning is crucial to understanding how we learn and make decisions. Learning and decision making are integral to political functioning, as such knowing these cognitive processes adds value for political researchers.

In conclusion, I strongly believe that neuropolitics should be more central to the study of political science and that, with time, the discipline will continue to evolve and become increasingly relevant.

Appendix A: Summary of Systematic Literature Review Findings

Year	Total # of Articles	# of Neuropolitics Articles	% of Neuropolitics Articles	Key Theme Topics	Key Methods	Key Hypothesis/ Findings
2010	32	8	25%	Cognitive Processes, Memory	Survey, Participant Testing	Emotion, places and attitudes drive bias.
2011	38	14	37%	Emotion, Cognitive Processes	Survey	Affective Intelligence Theory
2012	48	6	13%	Neuropolitical Methodology	Literature Review, Participant Study including fMRI	Beneficial to use tools of neuroscience.
2013	45	5	11%	Emotion, Cognitive Processes	Participant Testing	Attribution Theory, Trace Decay Hypothesis, Interference Hypothesis
2014	38	9	24%	Emotion	Participant Testing	Affective Contagion Hypothesis, Negative Emotions like Anxiety, Anger, Guilt have Pervasive Effects
2015	40	7	18%	Emotion	Participant Testing, Theory Analysis, Literature Review	Heuristics, Bias and Emotions have Moderating Effects on Behaviour and Decision Making

2016	54	7	13%	Cognitive Processing	Participant Testing	Priming can be used to alter attitudes and policy preferences. Anxiety produces impairments.
2017	66	6	10%	Emotion	Experimental Design	Negative emotion affects behaviour and decision-making.
2018	80	18	23%	Emotion, Cognitive Processes, Motivated Reasoning	Experimental Design, Panel Study, Survey, Narrative Analysis	The presence of others has a moderating effect on behaviour. The behaviour and role of the actor are affected by negative emotions such as fear and anxiety. Empathizing and levelling with citizens produces more positive effects than undermining citizens.
2019	82	33	40%	Emotion, Anger, Cognitive Processing	Participant Testing, Theoretical Framework Development, Lab Experiments	Cognitive processing is affected by various psychological processes. Emotion is susceptible to being shaped into a tool.

2020	61	14	23%	Cognitive Processing, Motivated Reasoning, Emotion	Framework/ Model Development, Participant Testing, Surveys	Cognitive bias can have a moderating effect making arguments that agree with the individual stronger. This bias can be mitigated through the use of minipublics. Collective emotion can be manipulated and has strong effects on national support.
2021	62	7	11%	Emotion, specifically Negative Emotion.	Panel study, Use of an Emotional Dictionary to analyze press releases and tweets, Theory Analysis	Manipulation of cognition and emotion is made easier by the digitization of society. Offloading reduces the cognitive burden.

Appendix B: Glossary of Theories

Affective Intelligence Theory

Emotions come before conscious reasoning. Alternatively, that emotions help to govern rationality as one of two available decision-making strategies.

Affective Tipping Point

The point at which voters abandon motivated reasoning by abandoning their preferences and begin rationally updating once again.

Affective Contagion

Ease of access to memory considerations is inhibited by incongruent information and biased by congruent information.

Appraisal Theory

Initial appraisal of a situation by an individual lead to an emotional response based on the evaluation.

Associative Networks

Model of the memory where concepts are represented as nodes. These nodes are linked by connections which enable the strengthening of certain memories over others.

Attribution Theory

How individuals use the information they perceive to create causal explanations for events.

Broaden-and-Build Theory

The theory that positive emotions have a broadening effect and are encouraging for the individual in terms of thoughts and actions.

Correspondent Inference Theory

Theory that there is an alignment between someone's personality and their exhibited behaviour.

Hot Cognition

A subset of motivated reasoning that theorizes an individual's thinking is largely influenced by their emotional state.

Image (Perception) Theory

Images in the sense of stereotypes. Systematic way of organizing perceptions of actors. Images are guided by strategic decision-making based on primary judgements. (Key question of image theory is, what determines the images?)

Interference

Whereby the recall of information is extraneously impeded.

Motivated Social Cognition

The needs and goals of the individual shape their thinking and can affect perceptions in social situations.

Offloading

The process of reducing cognitive load. This can be achieved by writing things down instead of committing them to memory or can be attributed to people's fondness for using online search engines to procure information instead of committing it to memory.

Terror Management Theory

A mortality salience theory. How people protect themselves against concerns about death.

Trace Decay

Whereby information gradually fades from memory over time.

Social Cognitive Theory

The observation of others in a social context contributes directly to portions of an individual's knowledge acquisition.

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* For a full list of articles analyzed, please see attached Appendix C.

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